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SCWDS BRIEFS

A Quarterly Newsletter from the
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Chronic Wasting Disease Update: October 2002

Chronic wasting disease (CWD) continues to command the attention of wildlife managers, animal health authorities, politicians, hunters, and the public. Additional infected deer and elk have been found in captive and wild cervid herds in several areas, and numerous states are gearing up to conduct active CWD surveillance during the fall hunting season. National planning continues and media coverage remains intense. Following are selected developments that have occurred since the last issue of the SCWDS BRIEFS.

Wisconsin – Chronic wasting disease was diagnosed for the first time in mid-September in a privately owned captive white-tailed deer. The adult buck was one of two animals tested from a Portage County shooting enclosure located approximately 100 miles north of the CWD management zone in south-central Wisconsin. The captive buck may have been purchased from a captive deer facility in Walworth County, Wisconsin, in the southeastern portion of the state where trace-back testing revealed a positive adult white-tailed doe in mid-October. Both farms are under quarantine, and epidemiological investigations continue in efforts to identify other potentially infected captive cervid facilities.

Landowners and government shooters collected about 1,500 free-ranging white-tailed deer in the CWD Eradication Zone during 1-week periods

in June, July, August, and September. All wild deer within the 389-square mile zone are targeted for depopulation in Wisconsin's effort to eliminate CWD from its valuable free-ranging deer herd. Six of 262 deer taken in June, 7 of 336 deer taken in July, and 9 of 358 deer taken in August tested positive, bringing the total number of positive wild deer in the zone to 40. Figures are not yet available for the August and September shooting periods. Landowners in the eradication zone will receive free permits to shoot deer during the prolonged firearms season that is scheduled for October 24, 2002, to January 31, 2003.

Minnesota – Chronic wasting disease was diagnosed for the first time in this state in August when a captive bull elk from an Aitkin County elk farm tested positive for the CWD agent. Chronic wasting disease now has been found in captive elk herds in Colorado, Kansas, Minnesota, Montana, Nebraska, Oklahoma, and South Dakota, as well as in the Canadian provinces of Alberta and Saskatchewan. The herd from which the positive Minnesota animal came has been enrolled in a CWD monitoring program since 2000, and in that time four herd mates have tested negative for CWD. Depopulation of the herd is underway. All 27 of the elk destroyed to date have tested negative for CWD, and 21 animals in the herd remain to be euthanized and tested. Two other central Minnesota elk farms were quarantined after epidemiological investigations revealed that the CWD-positive animal had spent time on those premises within the last 3 years.

To date, CWD infection has not been found in free-ranging white-tailed deer outside the positive facility. Samples from 97 whitetails killed by Minnesota Department of Natural Resources (MDNR) sharpshooters, bowhunters, area landowners, and traffic accidents have been submitted for CWD testing. Twenty-five deer have tested negative and results on the rest are pending. Current MDNR plans call for testing nearly 1,000 hunter-harvested deer in the management unit in which the positive captive elk facility is located, as well as in an adjacent unit. More than 5,000 deer from 15 management units statewide will be tested during the fall hunting season.

South Dakota – A 3-year-old captive elk in a Custer County herd in the Black Hills tested positive for CWD in August. A herd adjacent to this positive herd was depopulated 51 months previously due to CWD, and the current CWD-positive animal was from a quarantined herd that had been monitored for 52 months. The source of CWD in this case is unknown as the positive elk was born 15 months following the depopulation of the adjacent positive herd, its dam tested negative when slaughtered in December 2000, and 23 herd mates tested negative over the past 52 months. The herd of 143 animals has been depopulated, and results of CWD tests are pending.

Colorado – Five free-ranging elk and mule deer outside of the established CWD endemic area in northeast Colorado have tested positive for CWD since early September 2002. Four of the animals are from western Colorado where past surveillance had revealed only a single case of CWD - a positive free-ranging mule deer in March-April 2002 around a Routt County hunting enclosure that also contained positive entrapped wild deer. The five animals are a bull elk killed by a hunter in Summitt County in mid-September, an injured elk killed by Colorado Division of Wildlife personnel in Routt County, a hunter-killed mule deer in Mesa County, a road-killed mule deer in Routt County, and a mule deer killed by a bowhunter in Jefferson County, just southwest of Denver.

The Colorado Division of Wildlife, in cooperation with the Colorado State Veterinary Diagnostic Laboratory, has geared up to collect and test as many as 50,000 hunter-harvested deer and elk statewide this fall. Assistance is being provided by the Colorado Department of Agriculture and members of the Colorado Veterinary Medical Association, as well as by many guides and outfitters. An enzyme linked immunosorbent assay (ELISA) is being used as a screening procedure in the testing effort.

National CWD Management – A small group of people representing the United States Departments of Agriculture (USDA) and the Interior (USDI) and state wildlife management agencies completed a strategy for the implementation of the *National Plan for Assisting States, Federal Agencies, and Tribes in Managing Chronic Wasting Disease in Free-ranging and Captive Cervids*. The document identifies the objectives, timelines, agency responsibilities, and budgets for action items of the National Plan. The total budget for the first year is estimated at \$41.8M with figures of \$34.8M and \$31.7M annually in subsequent years. Funding is being sought for USDA and USDI, as well as for states and Native American tribes. (Prepared by John Fischer)

Coast to Coast in Four Years

The question of whether West Nile virus (WNV) would reach the Pacific coast this year was answered in September when a California resident was diagnosed with WNV infection. While most experts predicted the virus would spread throughout the United States, the speed at which it has done so was faster than expected. First identified in the United States in 1999, the mosquito-borne virus now has been detected in birds or mammals in 43 of the lower 48 states and in 4 of Canada's 10 provinces.

From 1999 through 2001, WNV infection was detected in 149 people, resulting in 18 deaths. So far in 2002, through October 21, WNV infection has been diagnosed in 3,231 people in 37 states and the District of Columbia. One

hundred seventy-sixty human deaths have been reported during this same period. While most attention during 2002 has been focused on human morbidity and mortality associated with WNV infection, the fact that thousands of birds continue to die from infection has remained in the background. Through mid-October 2002, WNV has been detected in over 10,000 wild birds, mostly in the family Corvidae (crows, jays, magpies, and ravens).

Recently, SCWDS has received numerous questions regarding WNV infection in non-corvid bird species and in wild and domestic mammalian species. Since introduction into the United States, WNV infection has been detected in more than 121 avian species and in a variety of other animals (alpaca, bat, cat, dog, goat, llama, rabbit, sheep, squirrel, and wolf). It probably is safe to assume that any species of bird or mammal is susceptible to WNV infection. However, WNV apparently does not pose a significant morbidity or mortality factor for species other than birds, horses, and humans, because reports of clinical disease due to WNV infection in other animals are few. Animals (including humans and horses) that have an underlying health condition and/or a compromised immune system have a higher risk of developing clinical disease following WNV exposure. (Prepared by Danny Mead)

West Nile Virus in Blue Jays

New interest in an Old World disease was sparked with the detection of West Nile virus (WNV) in the northeastern United States during the summer of 1999. The virus spread rapidly and by the summer of 2001 was detected in birds throughout the state of Georgia. SCWDS has collaborated with the Georgia Department of Human Resources since 2000 to test dead birds found throughout the state.

American crows (*Corvus brachyrhynchos*) are very susceptible to infection and represent a very reliable indicator for WNV activity. For this reason, they have represented the predominant species utilized in avian-based WNV surveillance activities. During 2001,

however, blue jays (*Cyanocitta cristata*) represented 30.3% of all dead bird submissions to SCWDS, while crows represented 17.4%. These submission rates suggested to us that blue jays may be locally important as an indicator species in this region.

To further explore this idea, we conducted a study focusing on WNV in the blue jays submitted to SCWDS during the summer of 2001. The objectives of this study were to evaluate gross pathologic lesions commonly associated with WNV infection in this species and to determine which tissues were most suitable for existing WNV detection techniques, including immunohistochemistry (IHC), virus titration, and polymerase chain reaction (PCR) techniques. In all, eight different tissues from each of 20 naturally infected blue jays were evaluated.

Our findings showed that tissue tropism for WNV in the blue jay is similar to the American crow. Highest virus concentrations were detected in brain, heart, and lung tissues, suggesting that any of these could be used for routine virus isolation-based surveillance. The high WNV titers in the blue jays, which sometimes exceeded a billion infectious virions per gram of tissue, reinforces the need for personal protection when handling the birds and performing postmortem exams.

Although virus titers in brain tissue were high, the tissues most likely to test positive on virus isolation, such as brain stem and cerebellum, proved to be the least sensitive tissue for immunohistochemistry (ICH). Tissues most likely to test positive by IHC include heart, kidney, and liver. Thus, tissue selection is critical for ICH. Using PCR, on the other hand, makes it possible to detect viral RNA in tissues determined to be negative by traditional methods of virus detection. For example, 4 of 20 muscle samples tested positive by PCR but were negative by virus isolation.

This study supports previous reports that species in the family Corvidae represent effective

indicator species for WNV. Predominant species incorporated into WNV surveillance programs will vary relative to the geographical range of bird species and local bird population abundance. It is anticipated that the list of corvid species impacted by this virus will greatly increase with the western expansion. (Prepared by Sam Gibbs)

Idaho Brucellosis Linked to Wildlife

The following article was written by Bob Hillman, Idaho State Veterinarian, and was published in the United States Animal Health Association Newsletter, Vol. 29, No. 2, July 2002. It is reprinted with permission of the author and the Newsletter.

On April 15, 2002, blood tests on a cattle herd from Fremont County in eastern Idaho revealed six animals were positive for brucellosis. The cattle herd, consisting of 50 adults and 10 yearling heifers, was tested because of exposure to a brucellosis-affected wild elk herd that was on the cattle's wintering and feeding areas of the ranch.

This cattle herd has been tested annually since 1998 because of the potential exposure to brucellosis-infected wild elk each winter on the herd's winter-feeding area. All the cattle were negative on each of the previous four annual tests. The cattle herd owner has chosen to feed elk in association with the cattle herd against the advice and recommendation of the state/federal animal health officials and the state fish and game officials.

During the winter of 2001/2002, animal health and fish and game officials captured and tested wild elk on the cattle ranch. One serologic reactor was slaughtered. Tissue samples were collected and submitted to the National Veterinary Services Laboratories (NVSL) for *Brucella* culturing. *Brucella abortus* biovar 1 was isolated from the elk.

The wild elk wintering on this ranch migrate out of Yellowstone National Park in the fall, spend

the winter on the cattle ranch, then migrate back into the park in the spring.

State and federal animal health officials collected milk samples for *Brucella* culture from each of the serologic reactors. Idaho animal health officials were notified on May 8, 2002, that samples from one of the serologic reactors yielded *Brucella abortus* biovar 1 on culture at NVSL.

Immediately upon receiving the final serology results on April 17, state and federal animal health officials began an epidemiological investigation to identify other cattle herds that may have been exposed to brucellosis or may have been the source of brucellosis infection. Thirteen herds, consisting of approximately 1,300 cattle, were identified as potentially exposed or potential sources of infection. Eight of these herds were pastured in common with the infected herd during the summer of 2001. The other five were adjacent herds. The epidemiological investigation revealed the only addition to the index herd during the past five years had been a bull, which was negative on the herd test.

Cattle from all the contact and adjacent herds were traced. Some cull cows and bulls had been slaughtered. A number of yearling females had been sold to feedlots. Approximately 400 potentially exposed bred beef heifers had been sold to out-of-state destinations. Of the cattle shipped out-of-state, some were shipped directly to ranches in Nebraska. Others were sold at a livestock market in Wyoming and subsequently shipped to Kansas and Nebraska.

Animal health officials in Idaho, Wyoming, Nebraska, and Kansas quickly traced and tested all the potentially exposed cattle that had not been slaughtered. All of the contact and adjacent herd cattle, which included animals in 38 herds in three states, were negative to the brucellosis test. Reviews of MCI records revealed that none of the slaughtered cattle were MCI reactors.

The infected herd was depopulated, with federal indemnity, on June 4 and 5, 2002.

Issues and Concerns – All of the epidemiological and laboratory information clearly indicates that brucellosis-infected elk transmitted the disease to the cattle herd. *Brucella abortus* biovar 1 was isolated from both elk and cattle on the same premises. The elk and cattle were fed in close association on the cattle winter feeding grounds. All potential cattle sources of disease were negative to the brucellosis tests.

This case illustrates the threat to the cattle industry of the United States from brucellosis-infected wildlife. Either *Brucella abortus* must be eliminated from all susceptible animals in the country or this kind of episode will be repeated over and over again.

This is the seventh case of epidemiologically linked transmission of brucellosis from wildlife to livestock since the 1960s. The last previous case was the Parker Land and Cattle case in Wyoming in 1989.

Editorial note by John Fischer – This case illustrates the livestock industry's grave concern when a domestic animal disease spills over and becomes established in a wildlife population. It is difficult to control or eliminate due to logistics, expense, and/or public opinion. Another current example of spillover is bovine tuberculosis in Michigan's white-tailed deer and cattle. The establishment of brucellosis and bovine tuberculosis in wildlife and their subsequent transmission to livestock highlights the need for appropriate biosecurity to prevent the spread of pathogens in either direction.

Tularemia in Pet Prairie Dogs

Tularemia caused a die-off of captured wild prairie dogs this summer at a Texas commercial exotic animal facility that distributes the animals for sale as pets. By August 1, 2002, when the distributor halted shipments, approximately 250 of 3,600 prairie dogs that had passed through the facility had died. The sick animals were

believed to be part of a single shipment of wild prairie dogs captured in South Dakota in May and June 2002.

After recognition of the problem, all prairie dogs shipped by the South Dakota trader after mid-May or by the Texas distributor after mid-June were recalled. However, exposed prairie dogs had been distributed to wholesalers, retailers, and customers in Arkansas, Florida, Illinois, Michigan, Mississippi, Nevada, Ohio, Texas, Washington, and West Virginia. Additional animals had been exported to Belgium, the Czech Republic, Japan, the Netherlands, and Thailand. The Texas Department of Health and the Centers for Disease Control and Prevention investigated the outbreak and notified the states and countries that received potentially infected animals. To date, no human cases of tularemia have been associated with exposure to the animals; however, unusually high morbidity and mortality occurred among the prairie dogs shipped to Texas, West Virginia, and the Czech Republic.

Tularemia, also known as rabbit fever, is a highly infectious bacterial disease caused by *Francisella tularensis*. The bacterium has a broad host range and has been documented in numerous species of mammals, birds, and invertebrates but primarily is a disease of lagomorphs and rodents. In North America, the cottontail rabbit, black-tailed jackrabbit, and snowshoe hare are the most commonly affected lagomorphs, while the most frequently affected rodents are the beaver and muskrat. Transmission of *F. tularensis* can occur via blood-feeding vectors (mosquitos, fleas, tabanid flies, and ticks), by contact with blood or tissues of infected hosts, by inhalation of aerosols, or by ingestion of contaminated water or meat.

Francisella tularensis is divided into at least two subspecies that vary in their pathogenicity, hosts, and epidemiology: Type A (*F. tularensis* biovar tularensis) is closely associated with cottontails, ticks, and biting flies, and it is highly virulent. In the United States, Type A

accounts for 70% of the human cases of tularemia, usually occurring during the summer from tick bites or during the fall and winter from handling rabbits. Type B (*F. tularensis* biovar *palaeartica*) more frequently affects beavers and muskrats with transmission presumed to be waterborne. Focal outbreaks or widespread epidemics may occur in these animals, and human cases are seen during winter trapping season, usually in association with handling carcasses of infected animals.

Clinical signs and lesions in infected animals vary with the susceptibility of the species, virulence of the bacteria, and the route of infection. Highly susceptible animals observed alive may be severely depressed or moribund prior to succumbing to septicemia, but clinical signs frequently are not described due to the acute nature of infection. Signs in less susceptible animals are associated with the route of infection and may consist of local inflammation or ulceration at the entry site and enlarged regional lymph nodes.

Postmortem lesions in highly susceptible animals are similar to those associated with other acute septic bacterial infections and consist of multiple pale foci of necrosis in the liver, spleen, and bone marrow. In less susceptible animals, there may be loss of body condition due to the more chronic nature of infection, as well as multiple granulomas in lymph nodes, liver, spleen, lungs, and kidneys.

In humans, signs and symptoms of tularemia are related to the route of transmission. An indolent ulcer at the site of introduction is the most frequent presentation, along with swelling of the regional lymph nodes. Ingestion of contaminated water or food may cause pharyngitis, abdominal pain, diarrhea, and vomiting. Inhalation may result in pneumonia or septicemia with a 30-60% case fatality rate if untreated. Human exposure can be prevented by avoiding ticks, flies, and mosquitoes, as well as not drinking, swimming, or working in untreated water where infection prevails in wild

animals. Additionally, sick wildlife should not be handled or consumed, rubber gloves should be worn when skinning and dressing animals, and meat of rabbits and rodents should be cooked thoroughly.

The growing trend towards keeping captured wild or exotic animals as pets has its hazards, and the recent tularemia outbreak is not the first incident in which a significant zoonotic disease has been moved via shipments of captured wild prairie dogs. In May of 1998, plague was diagnosed in an outbreak that killed 225 of 356 prairie dogs shipped from Hockley County, Texas, to a broker in Colorado County, Texas. Plague, also known as black death or bubonic plague, is a bacterial infection that has killed millions of humans since at least the 13th century. *Yersinia pestis*, the causative agent, can be transmitted to humans via the bites of fleas that have fed on infected rodents, ingestion of infected meat, or via aerosols. Both *Y. pestis* and *F. tularensis* are considered potentially devastating bioterrorism agents. (Prepared by Heidi Gordon and John Fischer)

AVM Studies Continue at SCWDS

Research conducted in 2001 by SCWDS in cooperation with the Georgia Department of Natural Resources, the U.S. Army Corps of Engineers, and Auburn University confirmed the widely held theory that raptors can acquire avian vacuolar myelinopathy (AVM) via ingestion of other affected birds. This was demonstrated experimentally when brain lesions developed in unreleasable, rehabilitated red-tailed hawks that were fed tissues from coots with AVM (SCWDS BRIEFS, Vol. 17, No. 2).

Avian vacuolar myelinopathy was first recognized in 1994 when it killed 29 bald eagles in Arkansas. Since then, AVM has been confirmed or suspected in the deaths of at least 90 bald eagles in Arkansas, Georgia, North Carolina, and South Carolina. AVM also is responsible for hundreds of American coot deaths and has been detected in other avian species, including mallards, Canada geese, great horned owls, and a killdeer. The cause of AVM

remains undetermined despite extensive diagnostic and research investigations by several state and federal wildlife resource agencies and universities. However, a natural or manmade neurotoxicant is suspected because there has been no evidence of viruses, bacteria, prions, or other infectious agents, and the lesions are consistent with toxicosis. To date, AVM has not been confirmed in mammals, and it remains unknown whether the cause of AVM could affect humans.

In 2002, SCWDS researchers conducted experimental feeding trials to determine if pigs develop vacuolar lesions in central nervous system myelin after ingesting tissues from affected coots. Pigs were chosen because of their availability, ease of feeding, and frequent use as animal models for a variety of human diseases. The research protocol was very similar to the previous year's feeding trial that involved red-tailed hawks. Young pigs ingested tissues from coots in which AVM had been confirmed microscopically. The pigs did not develop signs of central nervous system disease during the month-long trial. At the termination of the study, microscopic examination of brain, spinal cord, and peripheral nerves revealed no vacuolar or other lesions in the pigs. However, lesions consistent with AVM developed in an unreleasable, rehabilitated red-tailed hawk that served as a positive control animal.

Results of this trial indicate that young pigs do not develop central nervous system lesions within 1 month of consuming affected coot tissues under our experimental conditions; however, additional studies are warranted to further evaluate potential mammalian susceptibility to the AVM agent. As the AVM morbidity and mortality season approaches, SCWDS and other wildlife health and resource organizations are preparing to continue field and laboratory investigations in order to determine the cause of AVM, its source, and the range of susceptible species.

At The WDA

The Wildlife Disease Association (WDA) is an international group dedicated to the knowledge of wildlife health issues, and SCWDS members have always had a strong participation in this organization. The annual meeting of the WDA was held July 28-August 1 this year at Humboldt State University in Arcata, California. As always, this meeting provides the broadest accumulation of new information on wildlife health issues available at one sitting. Here are a few of the highlights:

House Finch Mycoplasmosis – This bacterial eye disease of house finches was first discovered in 1994. Personnel of the Cornell Laboratory of Ornithology have monitored this disease through a cooperative program among many bird feeding enthusiasts. There has been an estimated 60% decline in house finches in the eastern United States since the outbreak, and infection was considered to be a limiting factor for the species. Prevalence of infection fluctuates throughout the year and seems to increase in the late fall (October-November) and early spring (March-April). Increases in infection rates appear to be linked with winter severity.

Raccoon Rabies – When the raccoon rabies strain entered Ontario, Canada in 1999, a massive program was implemented to contain and eradicate the disease. Three steps were taken. In the area immediately surrounding the positive locales, trapping programs were conducted to reduce the local raccoon population. Peripheral to the depopulated area, raccoons and skunks were live captured, vaccinated by injection, and released. Further out, a second perimeter was treated with oral vaccine baits that were distributed by aircraft. Since the initiation of the outbreak in 1999, there have been 101 rabies cases, and the virus has spread 49 km in 3 years. The cost of the program has been \$5M (Canadian). Although this costly action has not totally contained the encroaching virus, the Canadians contrasted the 49 km advance in 3 years in Ontario favorably against the 40-60 km/year spread in the United

States that has occurred where no control program was conducted.

Toxoplasmosis – The newest finding regarding sea otters in California is the importance of toxoplasmosis as a mortality factor. *Toxoplasma gondii* is a protozoan parasite that can invade visceral organs and the central nervous system to cause acute, disseminated tissue necrosis and fatal meningoencephalitis in susceptible animals. In recent years, 36% of dead sea otters examined have been infected. Another tissue-invading protozoan, *Sarcocystis neurona*, also was found in 4% of the otters. These findings were unexpected, and it was hypothesized that the water is being polluted with these parasites by freshwater runoff and domestic sewage. Domestic cats are definitive hosts for *Toxoplasma* and shed large numbers of infective cysts in their feces. Various wild omnivores, particularly opossums, can shed *Sarcocystis* in a similar manner.

Sylvatic Plague – Recovery of remnant populations of the endangered black-footed ferret have been hampered by sylvatic plague, which is caused by the bacterium *Yersinia pestis*. Ferrets are exposed through bites from infected fleas or by eating infected prairie dogs. A recent pilot vaccination trial demonstrated that black-footed ferrets can be protected against this highly pathogenic organism.

Chronic Wasting Disease (CWD) – Multiple papers, mainly from Colorado researchers, were given on this emerging malady of deer and elk. An accurate live animal test for mule deer has been developed that involves taking a biopsy of tonsil tissue. Although the testing procedure requires labor-intensive capture of the animal and veterinary skill, it will be used in Colorado to study deer populations in National Parks and urban areas where harvest or culling is not politically acceptable. Epidemiologic studies in Colorado have identified a trend for CWD to be more prevalent in urban areas than nearby non-urban areas (animals concentrations? feeding?). Preliminary comparison of the Colorado data on deer density and CWD suggested that a

significant amount of the variation in CWD prevalence can be attributed to the estimated density of mule deer. (Prepared by Vic Nettles)

Graduate Student Accolades

Since the early 1960s SCWDS has maintained a highly regarded graduate studies program that provides training with an emphasis on wildlife population health. Within the program, MS and PhD degrees are available in the University of Georgia's College of Veterinary Medicine or the D.B. Warnell School of Forest Resources, depending upon the student's interest. Graduate students receive degrees in various disciplines such as Veterinary Parasitology, Veterinary Pathology, Medical Microbiology, or Wildlife Ecology and Management. We have been fortunate in that so many exceptional and motivated students have selected SCWDS as the place for their graduate studies, and our current assemblage of students is no exception.

At present, there is a record number of graduate students working on wildlife health research at or in collaboration with SCWDS, and all are of the highest caliber. Dr. Randy Davidson has three students seeking PhD degrees in Veterinary Parasitology (Ms. Vivien Dugan, Dr. Cynthia Tate, and Mr. Michael Yabsley) and two students working on MS degrees in Wildlife Ecology and Management (Ms. Britta Hanson and Ms. Marsha Ward). Dr. David Stallknecht has three PhD students in Medical Microbiology (Mr. Andrew Allison, Dr. Samantha Gibbs, and Ms. Molly Murphy).

In testimony to the excellent working relationship that SCWDS enjoys with other faculty in the College of Veterinary Medicine, there are three other students working collaboratively on projects involving wildlife health. Dr. Buffy Howerth has two students who are pursuing PhD degrees in Veterinary Pathology under her supervision (Dr. Angela Ellis and Dr. Prachi Sharma). Dr. Susan Little has one student working on a PhD in Veterinary Parasitology (Dr. Andrea Varela). Graduate research topics of these 11 students include West Nile virus, avian influenza virus, epizootic

hemorrhagic disease virus, and several species of *Anaplasma*, *Borrelia*, and *Ehrlichia* that are of human and veterinary importance. Drs. Howerth and Little are both former SCWDS graduate students, and SCWDS is fortunate that they have maintained close research collaboration with SCWDS since their graduate student years. In this same vein, it is interesting to note that veteran SCWDS staff member Dr. Randy Davidson received his MS and PhD degrees as a graduate student here, as did our former director, Dr. Victor Nettles. In fact, there are a great many former SCWDS graduates who hold important positions in teaching, research, and service in wildlife health and veterinary medicine across the country.

Not only is the current group of students contributing to the overall SCWDS mission by conducting wildlife health research and contributing to other SCWDS activities, they have done an excellent job of taking their work to the scientific community. Within the past year, seven of them were successful in obtaining competitive travel funds totaling more than \$8,700 to attend and present their work at scientific meetings. These included the 51st Annual Wildlife Disease Association Meeting, the 47th Annual Meeting of the American Association of Veterinary Parasitology, the 5th International Avian Influenza Symposium, and the joint meeting of the 77th Annual Meeting of the American Association of Parasitologists and 10th International Congress of Parasitology.

In addition, five students have recently received seven awards in recognition of their work at various venues. Ms. Vivien Dugan won second place for a poster at the Annual Research Day at the University of Georgia's College of Veterinary Medicine.

Vivien also won the Pfizer Travel Award given through the College. Dr. Samantha Gibbs received the Wildlife Disease Association's Student Research Recognition Award. Dr. Cynthia Tate was selected by the American Association of Veterinary Parasitologists to receive the Best Student Presentation Award. Dr. Andrea Varela won second place in the Student Presentation Award for her presentation at the meeting of the American Association Veterinary Parasitologists. Mr. Michael Yabsley received the Wildlife Disease Association Student Scholarship and the S.A. Ewing Vectorborne Parasitology Award from the University of Georgia's College of Veterinary Medicine. We extend our heartiest congratulations to these exceptional students and sincerely appreciate their superior efforts. (Prepared by Gary Doster)

Information presented in this Newsletter is not intended for citation in scientific literature. Please contact the Southeastern Cooperative Wildlife Disease Study if citable information is needed.

Recent back issues of *SCWDS BRIEFS* can be accessed on the Internet at SCWDS.org.